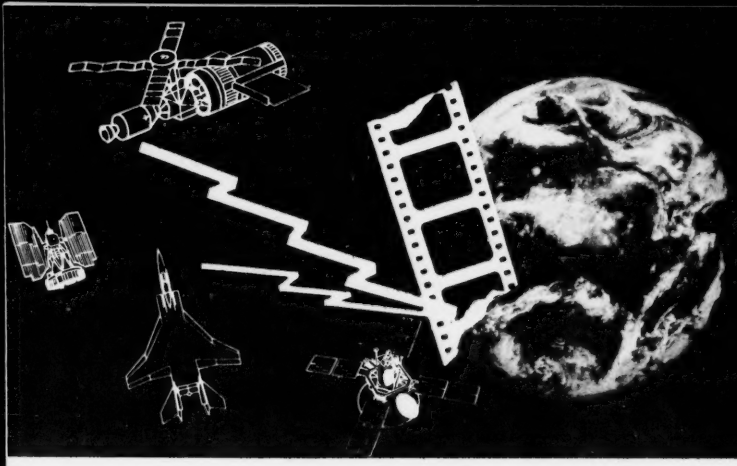

NASA ACTIVITIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

September 15, 1974 Vol. 5, No. 9

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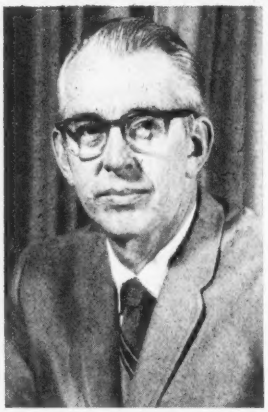
LETTER FROM WASHINGTON

September 6, 1974

Dear Colleagues:

I would like to take this opportunity to inform you of the comprehensive planning study called "Outlook for Space" that is now underway within NASA and to urge you to contribute ideas and comments.

A group of 21 persons has been named to take the initiative and the responsibility for conducting the study. Details about the study and the names of members of the group are printed elsewhere in this issue of NASA ACTIVITIES. If you feel you have a contribution to make to this important NASA undertaking, you are advised to get in touch with any one of them, or with the Study Director, Donald F. Hearth, at the Goddard Space Flight Center. Or write directly to me and I will forward your contribution to Mr. Hearth.



The purpose of the study is to help identify the most promising projects to explore and exploit space for peaceful purposes in the two decades from 1980 to 2000. I have emphasized that I want this study to be comprehensive and imaginative and to examine the relationship of space to national goals and objectives. We are definitely looking for new ideas, as well as the best ways to follow up on current efforts.

I would also like to explain how this new study,

COVER

A photographer recently got this view of the stable of aircraft at Flight Research Center. The newly-acquired Boeing 747 to be used in Shuttle Orbiter transport is not shown. **(See Page 24)**

"Outlook for Space," relates to the study completed last October called "The 1973 NASA Payload Model: Space Opportunities 1973-1991."

"The 1973 NASA Payload Model" is a baseline set of possible future payloads for use in planning and evaluating likely uses for the Space Shuttle, the Space Tug, and the Spacelab. It was generally limited to missions which were logical follow-ons to programs of the 1970s and which we would probably want to fly whether or not the Space Shuttle were developed. It also describes likely missions for the Spacelab, which, of course, does require the Space Shuttle to take it to orbit and back.

Our new study, "Outlook for Space," assumes that the Space Shuttle will be ready for operational use beginning in 1980; and it requires us to take a fresh look at the new opportunities which the Shuttle and our other programs of the 1970s will open up for us in the 1980s and 1990s, in addition to the logical follow-on programs suggested in "The 1973 NASA Payload Model."

The 1973 study is still a useful guide to the kinds of missions we can fly in the years ahead using the Shuttle and Spacelab and relying on annual budgets at about the current level, or somewhat higher, with due allowances for inflation.

We have launched the new study, "Outlook for Space," without a lot of fanfare or publicity. But we certainly want everyone in NASA to know about it. We have informed the appropriate committees of Congress about it, and the people we work with at the Office of Management and Budget. We hope it will be kept in proper perspective—in our own minds and in the news stories that are written about it. Its main purpose is to assist NASA in presenting the best possible space programs relevant to national needs for the next quarter century to the Administration, the Congress, and the American people.

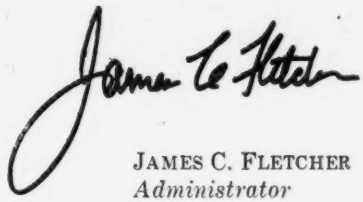
It will help us explain to potential space users in science and industry what the future opportunities for them are going to be. It will help us in our continuing effort to increase international cooperation in space exploration and use. It will help us in planning well for NASA's future, and for the future of NASA people.

I emphasize that we anticipate imaginative ideas. But we should always keep in mind that, no matter how challenging, how exciting, and how potentially rewarding some of the options may be, we will still have to make hard choices to keep within the annual budget limits the country sets for us.

In short, our progress in recent years and continued support in Congress for the Space Shuttle make it imperative that we now take a fresh and searching look at the space opportunities that lie ahead, so that we will be able to make the best possible recommendations for our national and international space efforts in the next 25 years.

I want this to be an outstanding long-range planning effort. To succeed, it must be an all-inclusive effort; that is, good suggestions can come both from within and from outside NASA. We are involving as many people as practical in this effort, but fresh ideas from any of you are welcome.

Sincerely,



JAMES C. FLETCHER
Administrator

NASA's Earth Resources Technology Satellite (ERTS-1) is rapidly becoming an important tool for hydrologists as more and more data are returned from the spacecraft and analyzed in relation to present water resource management practices which permit man to extract water economically from only about 0.01 per cent of the total global supply.

In industrial nations, it is apparent that better utilization of water is a necessity. Per person demand in the larger cities of the U.S., for example, is more than 20 times that in some of the underdeveloped countries.

An automated blood pressure monitoring system developed for the NASA Integrated Medical and Behavioral Laboratory Measurement System Program (IMBLMS) is being evaluated for use in studies in control of high blood pressure in human beings.

The system uses the blood pressure cuff, originally developed for IMBLMS, in conjunction with an automatic blood pressure monitoring system to obtain blood pressure measurements.

PLANNING STUDY LAUNCHED TO SHAPE SPACE PROGRAM

NASA Looks Ahead on Activities During Years from 1980 to 2000

NASA has embarked upon a comprehensive planning study called "Outlook for Space" to help identify the most promising possibilities for the exploration and peaceful exploitation of space during the two decades from 1980 to 2000. The study is scheduled for completion by June 1, 1975.

All possible space endeavors deemed desirable and practical will be examined, including potential operational and commercial uses of space.

Dr. James C. Fletcher, NASA Administrator, has called for a far-reaching and imaginative effort, and has urged all NASA employees to contribute ideas and comments. (See LETTER FROM WASHINGTON on Page 2 of this issue of NASA ACTIVITIES.)

A Study Group composed of some of NASA's most creative individuals will work in concert with others from industry, universities, and government to define possible directions of the civilian space activities during the remainder of the 20th century. Together they will identify all activities having scientific or applications potential, as well as possible economic and sociological benefits from the use of space in the future.

Objectives

1. To relate the goals and objectives of possible civilian space activities in the period 1980 to the year 2000 to national goals and objectives.

2. To develop an unconstrained listing of desirable and practical U.S. civilian space activities for the period 1980 to the year 2000, and beyond.

3. To identify a grouping of activities that are consistent with specific sets of goals, objectives and themes.

4. To define Research and Development Tasks required to meet potential commercial and operational uses of space in the future.

5. To identify social and economic challenges facing the nation during the remainder of this century which can benefit from the use of space.

Topics to Be Considered

The following is a partial listing of possible future space activities to be considered in the study:

- Planetary exploration after Viking
- Space processing and manufacturing
- Future of astronomy, astrophysics, and other space sciences
- Terrestrial communications and information transfer
- Monitoring and management of terrestrial resources
- Use of space for terrestrial energy supply
- Monitoring and management of terrestrial weather and environment
- Interstellar probes
- Manned bases/laboratories in Earth orbit, on the Moon and planets, and space colonization
- Search for intelligent extraterrestrial life

Approach

The NASA Study Group will be the focus of the effort. It will work closely with NASA management and a group of consultants. The consultants will be individuals respected for their imagination and farsightedness who will provide ideas and suggestions on future uses of space.

The Study Group will:

- Catalogue a list of attractive candidates for U.S. civilian space activities for the period between 1980 and 2000 using inputs from the consultants, the Directors of the NASA Field Centers and the Program Associate Administrators.
- Single out those technologically feasible missions and programs that have high scientific, applications, operational and/or commercial value.
- Identify blocks of missions by time periods consistent with specific sets of objectives and themes.
- Assess the current state of the art and identify technology advances required.
- Consider overall resource requirements in the latter phases of the study; alternatives will be considered in relationship to each other.

Organizational Considerations

1. Members of the Study Group will devote between 25 and 50 per cent of their time to the study over an 11-month period. On occasion, the study will require their full-time participation for periods of up to two or three weeks at a time. Part-time involvement has permitted the selection of highly-qualified personnel who will continue

their current assignments within NASA. The Study Group will be supported by a small, full-time administrative staff.

2. The Study Group Director will report to the NASA Associate Administrator; the Administrator and Deputy Administrator will also interface closely with the Study Group. Management will review study progress at least monthly and will formally review the study output at three major milestones.

3. A group of individuals respected for their creativity and farsightedness will serve as consultants to the Study Group. They will provide ideas and suggestions for future activities in space. The consultants will be from universities, industry, and government, as well as writers and other individuals. In addition, other government agencies, industrial associations, technical societies, and NASA advisory groups will be solicited for suggestions on future space activities.

4. The Study Group will also be supported by:

- The Directors of the NASA Field Centers and Headquarters Program Associate Administrators who will provide planning suggestions and ideas, as well as periodically review the study.
- Working groups will be assigned specific tasks to perform in-depth studies of systems and programs that evolve during the planning study.

5. All NASA resources required for the proper conduct of the study will be provided by NASA management; the study will have a separate budget (for consultants, studies, and travel expenses).

Overall Schedule

The study is divided into three major phases: the first will be the gathering of ideas and suggestions; the second will be the detailed examination of the more attractive possibilities and the grouping of activities around central themes; and the third will be a recycle/re-examination/trade-off phase. Formal reviews by NASA management will be held at the conclusion of each phase.

The overall schedule is:

First Phase

- Initiation of study
  —late June, 1974
- Inputs on future ideas
  —August/September
- First output of Study Group
  —early October
  —listing of possible future space objectives, directions, etc.
  —possible central themes for grouping of future space activities
- Management review
  —early to mid-October

Second Phase

- Completion of detail studies
  —early February, 1975
- Second output of Study Group
  —mid-February
  —Identify most attractive, beneficial and practical options with back-up information
- Management review
  —mid to late February

Third Phase

- Recycle, trade-offs, consideration of new inputs
  —March and April
- Final management review
  —May
- Final product of study
  —June 1, 1975

Organization for the First Phase

The Study Group has been divided into Working Groups for the first phase. Two groups are responsible for gathering and focusing inputs on the following question: What are the most interesting and worthwhile things the United States can do in space during the 1980-2000 time period with today's and tomorrow's tools? Dr. Robert Jastrow is chairing the group which deals with terrestrial activities. Dr. S. I. Rasool is chairing the group which deals with extraterrestrial activities. A group, under Philip Culbertson, is responsible for a mockup/breadboard/framework of the study's output. Another group, under William Stroud, is responsible for bringing to the Study Group the best possible understanding of the future environments (social, economic, etc.) for the time period under study. In addition, JPL has been assigned a task to provide support to the Study Group on technology status and possible future technological innovations. Jack James of JPL is the leader of the JPL task; Ludie Richard and Col. Alfred Worden of the Study Group will work with JPL.

Study Group Membership

The following are members of the Study Group:

Donald P. Hearth, Study Director	GSFC
Dr. Robert Jastrow, Deputy Study Director	GISS
Dr. Joseph P. Allen	JSC
Tommy C. Bannister	MSFC
John Billingham	ARC
Alan B. Chambers	ARC
Philip E. Culbertson	HQ-OMSF
Wayne D. Erickson	LaRC
Comdr. Joseph P. Kerwin	JSC
Dr. William C. Phinney	JSC
Joseph V. Piland	JSC
E. Brian Pritchard	LaRC
Ichtiaque S. Rasool	HQ-OSS
Ludie G. Richard	MSFC
Nancy G. Roman	HQ-OSS
Jerome D. Rosenberg	HQ-OA
Joseph N. Sivo	LeRC
William G. Stroud	GSFC
Alfred M. Worden	ARC
J. Hamel	USAF
Paul A. Villone, Admin. Officer	GSFC

NEW RESEARCH OFFICE

An Independent Research and Development (IR&D) Office to encourage a strong interaction between industry and NASA has been established at Headquarters with Dr. Ralph R. Nash, former Executive Secretary of the Research Council, Office of Aeronautics and Space Technology, as Manager.

In announcing the new office, Dr. James C. Fletcher, NASA Administrator, said that the main purpose of the two-way communication "is to stimulate rapid, direct dissemination of contractor IR&D information into NASA technical programs and to inject NASA needs into contractor IR&D plans and programs at an early stage."

Independent Research and Development (IR&D) is a term used by federal agencies to distinguish between a contractor's research and development technical effort performed under a government contract or grant (R&D) and that which is independently self-initiated and self-funded (IR&D) by the company or corporation.

Costs of contractor IR&D are treated as indirect expenses and are recovered, in whole or in part, through overhead reimbursement made on contracts being performed by the contractor for NASA, the Department of Defense and all other customers. NASA and the DOD share a vital interest in the magnitude and content of their contractors' IR&D programs.

The new NASA office will manage NASA-wide technical evaluation of the IR&D program, providing a focal point for coordination of IR&D information mutually beneficial to both industry and NASA. It will help couple NASA advanced technology needs with contractor capabilities and help identify IR&D program benefits to NASA.

Dr. Nash, who received his M.S. and Ph.D. degrees from Rensselaer Polytechnic Institute and was a faculty member of its Department of Metallurgy from 1948 to 1957, has been with NASA since 1963. He was formerly manager of the Atomic Energy Commission's basic research programs in solid state physics, physical metallurgy, and ceramics.

17 IN CO-OP PROGRAM

Seventeen high school graduating students participated in the Feeder Co-op Program at Marshall Space Flight Center this summer.

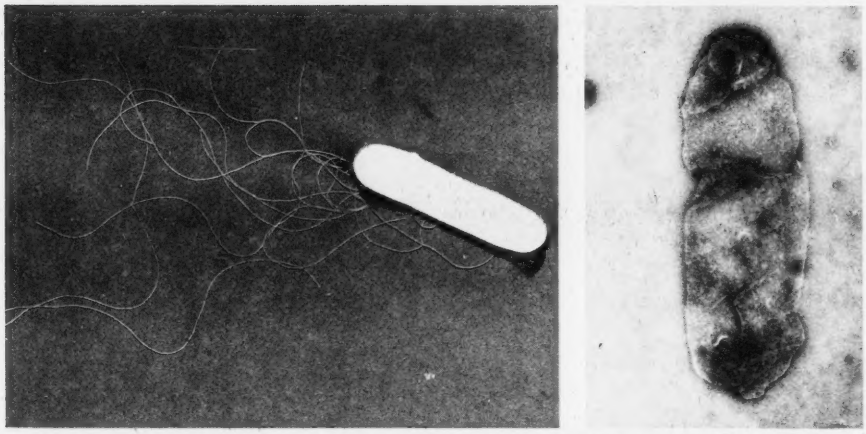
Initiated as a means of attracting more high school graduates to the scientific and engineering professions, special emphasis is placed on increasing the enrollment of females and minorities in these disciplines.

At the end of their summer employment, the students will enter an engineering school, with MSFC paying their first year's tuition. At the end of their freshman year, they will return to MSFC under the Professional Co-op Education Program on regular alternating periods of work and study.

RESEARCHER COMPLETES TENURE

Dr. Biliyar N. Bhat, a native of India and a National Research Council associateship recipient, completed on August 17 his two-year tenure at Marshall Space Flight Center as a research associate in the Materials and Processes Lab.

Dr. Bhat's research at MSFC involved studying the effect of temperature differences on atom movement in aluminum-copper alloys. He assisted in the development of the eutectic solidification experiment that was conducted aboard Skylab to determine the effects of zero-gravity on crystal growth.



BACTERIA UNDER STUDY—On the left is shown an alkali-tolerant bacterium with long flagella, while at the right is the cell membrane of a thermophilic bacterium after removal of the cell wall and cell contents.

ARC GIVES SPECIAL STUDY TO BEHAVIOR OF BACTERIA

Dr. Heinrich, Branch Chief, Discusses Findings as Probes Are Made of Other Planets

Is there life on other planets? Would Earth organisms, if they were accidentally carried by spacecraft to another planet, be able to survive and contaminate it?

These are questions of special interest to the Biological Adaptation Branch of Ames Research Center. This group of microbiologists and biochemists studies organisms which have adapted to a variety of extreme environments on Earth. They would like to know how these bacteria have changed their constituents in order to live under conditions ranging from boiling water to saturated salt solutions.

As a focus for this research, the Biological Adaptation Branch at Ames Research Center recently held its third biennial meeting on the subject of "Extreme Environments: Mechanisms of Microbial Adaptation."

Dr. Milton R. Heinrich, Chief of the Branch, explained after the meeting that the benefits of understanding these mechanisms are not limited to NASA's planetary biology programs, but also apply to the control of bacteria, and their beneficial use in industry and in the environment.

"In spite of widespread interest in bacterial adaptability and research in many laboratories throughout the world," he said, "we are only beginning to understand the adaptation process."

To someone not familiar with the amazing adaptability of bacteria, he pointed out, conditions on other planets might seem to rule out the presence of life. Even Mars, which resembles Earth the most, has less than 1 per cent of Earth's atmospheric pressure, only traces of oxygen in its atmosphere, and is drier than any place on Earth.

Scientists have learned that, in the warmest areas of Mars, the surface temperature drops to about minus 100 degrees Fahrenheit every night and rises to about plus 70 degrees Fahrenheit each day. Yet several laboratories have found that there are many varieties of Earth bacteria which can survive those conditions. The low pressure and lack of oxygen seem to create no problem. Work at ARC has shown that bacteria not only survive, but multiply, when kept in the martian diurnal cycle of 20 hours frozen and four hours thawed.

High Salt Concentration

Dr. Heinrich reported that another factor on Mars which, at first thought, would discourage the presence of living organisms is the prediction that any water there would have a high concentration of salt. This view is based on theories of planet origins which say that Mars probably had much more water earlier in its history, a condition supported by Mariner 9 photos showing dry river channels and canyons.

"If water had been present and subsequently evaporated," he continued, "it would have left behind all the salts it had extracted from the rock and soil. In fact, some people have predicted that the only water remaining would be that trapped in pools saturated with salts. Brines have been used for many centuries in food preservation, because they prevent the growth of most microorganisms. Nevertheless, there are many varieties of bacteria, algae, and fungi which not only tolerate high concentrations of salt, but actually require it for growth. These 'halophilic' bacteria are under intensive study at ARC to determine how their cell walls and internal components function in the presence of the salt, and whether they might be models for a martian organism."

Venus is another planet that was considered as a possible abode for life, Dr. Heinrich recalled, but which now looks less attractive after visits by several spacecraft. The carbon dioxide atmosphere, he added, would not discourage bacteria, because they would easily use it. This also would be true with the high atmospheric pressure, he explained, because bacteria are found in the Earth's deepest oceans at pressures of over a thousand atmospheres.

"But no living organism that we can suggest," he said, "would live on the surface of the planet, where it is hot enough to melt lead. Scientists have suggested, however, that organisms could float in the dense atmosphere at more reasonable temperatures, perhaps regulating their buoyancy with a gas bubble, as many organisms do in our oceans.

"Surprisingly, the adaptation to growth at high temperatures is fairly widespread among microorganisms on Earth. The most impressive are the bacteria which live in what seems an impossible environment—boiling natural springs. Even home hot water tanks frequently have cultures of these harmless 'thermophilic' bacteria.

"ARC scientists are studying several of the ways in which these organisms have adapted to heat: how they have changed the structure of their normally heat-sensitive enzymes so they will continue to catalyze all the reactions needed for life, even at high temperatures; how they stabilize their genetic nucleic acid, which normally falls apart at these temperatures; and how they regulate the kinds of fat they synthesize, so it will not be too soft or too hard at a particular growth temperature."

Information Changes Attitudes

Until recently, according to Dr. Heinrich, the outer planets were regarded as unlikely places to find living organisms. As more information accumulates, however, including that from the Pioneer 10 Jupiter fly-by, he added, it is apparent that Jupiter and Saturn should not be ignored.

He listed as three of the principal constituents of Jupiter hydrogen, methane, and ammonia, while some water is found in the atmosphere.

"These are thought to be the same components which were present in the atmosphere of the primitive Earth," he said, "and which eventually led to formation of all the organic compounds needed before the first life could appear. If similar processes took place on Jupiter, then it may be possible to find some of the intermediates in the chemical evolution process (compounds which were exhausted long ago on Earth), or even living organisms.

"Jovian life forms could use hydrogen or methane for energy—processes which are well known in Earth organisms. They would also require a considerable tolerance for ammonia. Bacteria on Earth have not needed to adapt to such high concentrations, but some isolated from alkaline springs in California by ARC scientists have been able to grow in more alkaline solutions than any previously reported."

Dr. Heinrich explained that the bacterial adaptations he had described—to high temperature, low and high pressures, freezing, high salt concentrations, alkalinity—are only a fraction of the repertoire of terrestrial bacteria. In fact, he revealed, they have inhabited every natural environment found on Earth, plus many artificial ones.

"There are strains which grow at temperatures below freezing, or in very low concentrations of water," he said. "Others grow in concentrated solutions of acid, either in mine drainage or in the laboratory. Microorganisms will frequently adapt to toxic chemicals, to the point where they will decompose them and use them for food. They can develop such tolerance for radiation that they grow in the cooling water of nuclear reactors."

MANAGEMENT PARTICIPANTS—A reception recently was held in honor of those who took part in the 1973-74 NASA Management Development Program. Dr. James C. Fletcher, Administrator, was present and presented each with a certificate of participation. Left to right, are Gregory M. Reck, Lewis Research Center; Masayuki Omura, Ames Research Center; Ernald B. Graves, Langley Research Center; Dr. Fletcher; Ray V. Hood, Langley Research Center; David A. Kier, Flight Research Center; Darrell R. Branscome, Langley Research Center; and Michael C. Fischer, Langley Research Center.

7 END MANAGEMENT PROGRAM

Seven participants recently completed the tour of duty connected with NASA's new Management Development Program, established last year in the Office of Aeronautics and Space Technology to provide work and training opportunity at Headquarters for Center personnel.

Participants are nominated by their Center Directors and are selected as having the potential to perform future executive-level functions.

During a 12-month tour of duty at Headquarters, they are given job assignments to increase their understanding of operations and, at the same time, are provided an opportunity to develop their managerial talents.

The program is under the direction of E. C. Kilgore, Deputy Associate Administrator for Center Operations.

Following the recent reorganization of the space agency, NASA Deputy Administrator George M. Low, who at that time was appointed also to serve as Acting Associate Administrator for Center Operations, decided to expand the Management Development Program to include all field installations. As a result, 24 individuals will participate during 1974-75.

GROO JOINS NASA

Elmer S. (Todd) Groo, former Vice President of the IBM World Trade Corp., has been appointed Associate Administrator for Center Operations at NASA Headquarters, effective Sept. 4.

In that capacity, he will be responsible for agency-wide planning and for direction of institutional resources and operational activities at NASA field installations.

Before retiring from IBM Corporation, where he spent his entire professional career, he headed its marketing, personnel and external relations departments and its European operations.

RAY KLINE REASSIGNED

Ray Kline, former Assistant Associate Administrator for Organization and Management, has been appointed Assistant Associate Administrator for Center Operations.

In his new position, he will continue to perform management studies on a wide range of agency policy and organizational problems. He also will oversee the activities of the ADP Management Office, which will report to him.

EEO ADVISORS—Above are shown members of the original EEO Advisory Group. More recently, Ms. Penny Kafka has been succeeded by Ms. Dale Eno.

ADVISORY GROUP STUDIED AS COMMUNICATIONS MODEL

12-Member EEO Panel Keeps Officials Aware of Employees' Reactions and Concerns

An Equal Employment Opportunity Advisory Group installed last March 22 by Dr. James C. Fletcher, NASA Administrator, is being watched closely as a possible model to improve both the EEO and communications programs.

The overall goal of this experimental group, as laid out at the time of its formation, is to improve communications from the bottom to the top of the space agency. Its specific objective is to advise the Administrator, the Deputy Administrator and other Headquarters officials of employees' concerns and views in EEO matters.

The group consists of 12 elected members, chosen through a two-step procedure. In the first step, employees are invited to nominate themselves and/or as many other employees as they desire. By a count of the nominations for each individual nominee, an election committee identifies a total of 24 nominees, with six from each of the following four groups: minority female, minority male, non-minority female, non-minority male. In the second step, employees vote in a general election for three from each of the four groups, resulting in a total of 12 members chosen by secret written ballot.

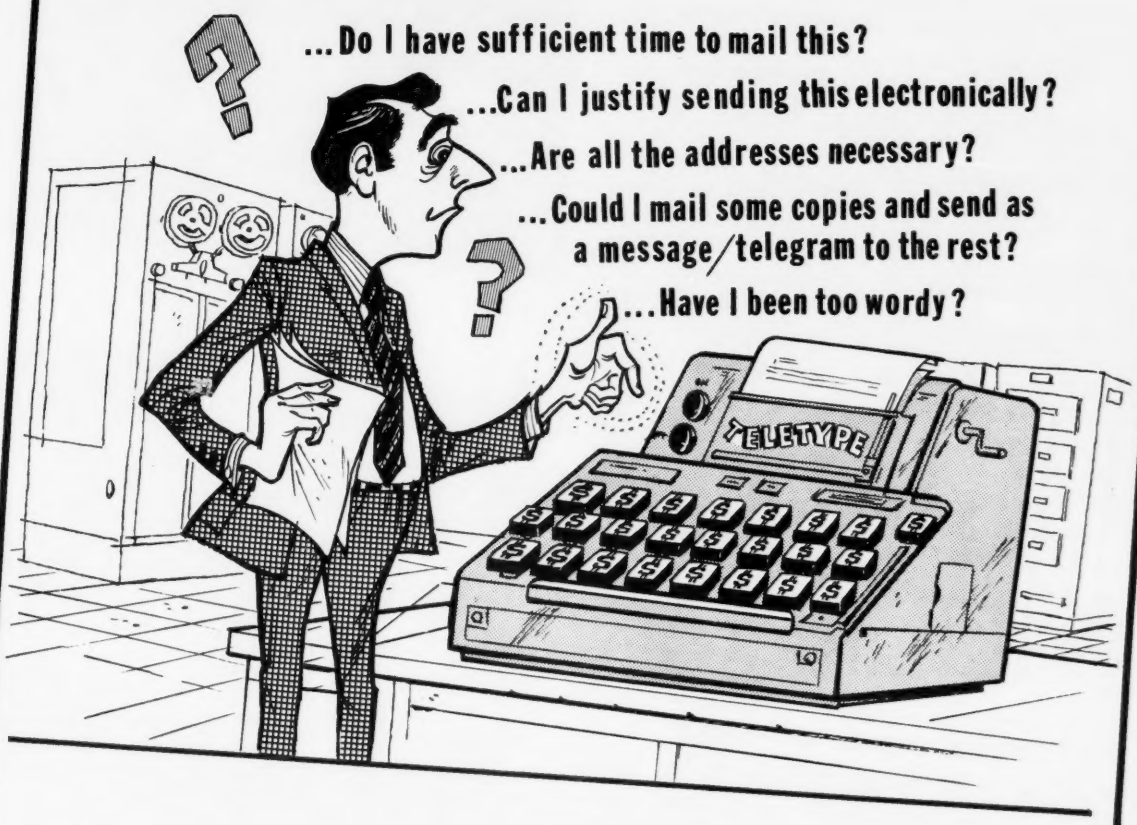
GIBSON TO RESIGN

Dr. Edward Gibson, science pilot on the Skylab 4 mission, has announced he will leave the NASA astronaut corps on Nov. 30 to join the Aerospace Corporation of Los Angeles as a senior staff scientist.

In his new position, he will specialize in the interpretation of solar data gathered during the 171 days of manned operation of the Skylab program. With a doctorate in engineering from the California Institute of Technology and an honorary doctorate of science from the University of Rochester in New York, he authored a textbook on solar science during his years with NASA.

Gibson has been a scientist-astronaut since 1965. On the Skylab flight, he was the crewman primarily responsible for the 338 hours of operation of the Apollo Telescope Mount which made observation of solar processes.

LOW COST CORNER


...Do I have sufficient time to mail this?
...Can I justify sending this electronically?
...Are all the addresses necessary?
...Could I mail some copies and send as a message/telegram to the rest?
...Have I been too wordy?
TELETYPE

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SUGGESTS YOU ASK YOURSELF EACH OF THE ABOVE QUESTIONS BEFORE TRANSMITTING YOUR MESSAGE.

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LOVELACE COMES TO NASA

Dr. Alan M. Lovelace, Acting Deputy Assistant Secretary of the Air Force for Research and Development and formerly Director, Science and Technology, Air Force Systems Command, has been appointed Associate Administrator for NASA's Office of Aeronautics and Space Technology (OAST), effective Sept. 1.

He replaces Gen. Bruce K. Holloway, USAF (Ret.), Acting Associate Administrator for Aeronautics and Space Technology and Assistant Administrator for DOD and Interagency Affairs, who retired August 20.

Commenting on the new appointment, Dr. James C. Fletcher, NASA Administrator, said: "NASA is extremely fortunate to gain the leadership of Dr. Lovelace. His experience in managing very complex organizations engaged in research, exploratory, engineering, and advanced development programs will provide the competent and technical direction to continue NASA's aeronautics and space technology programs."

A graduate of the University of Florida, Dr. Lovelace has received several outstanding awards for his work in chemistry. He became Director of the Air Force Materials Laboratory in 1967.

THOLE SUCCEEDS JOHNSON

John M. Thole, Project Manager for the Applications Technology Satellite at Goddard Space Flight Center, has been named Deputy Associate Administrator for Space Science, succeeding Vincent L. Johnson, who has retired.

In his new position, Thole will report to Dr. Noel W. Hinners, Associate Administrator for Space Science.

John M. Thole

Holding a B.S. degree in engineering from the University of Evansville, IN, and an M.S. degree from the University of Maryland, he joined GSFC in 1960 and has served in project management positions for ECHO, ATS, AOSO, ERTS, and OSO projects.

He received NASA's Exceptional Service Medal in 1971 for his role in the recovery of OSO 7, Group Achievement Awards in 1968, 1969, 1970 and 1971, a Certificate of Commendation in 1971, and a Certificate of Merit in 1972.

Mrs. Sue A. Weissenegger

DEPUTY CHIEF COUNSEL

Appointment of Mrs. Sue A. Weissenegger, a former employee of the Justice Department in Washington, as Deputy Chief Counsel at the Kennedy Space Center was announced recently by Dr. Kurt H. Debus, Director.

A graduate of Southeastern University in Washington, Mrs. Weissenegger was admitted to the District of Columbia bar in 1941 and to the Florida bar in 1971. As a Justice Department employee, she was loaned to the Army to represent the U.S. in the Nuremburg trials. Later, she was an assistant district attorney and a judge in the U.S. court system in Stuttgart, Germany.

In 1962, she was employed by the Chief Counsel's Office at KSC and the following year became a member of the legal staff.

SKYLAB MOCKUP EXHIBITED

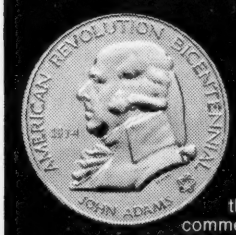
Visitors to the Marshall Space Flight Center now can enter and view a full-size mockup of the Skylab workshop.

The mockup has been modified to accommodate visitors and to be included as a part of the Alabama Space and Rocket Center bus tour.

Visitors taking the bus tour previously could view the Skylab mockups only from a distance. Now tourists can enter the crew compartment of the workshop.

In addition to the modifications to the workshop, access platforms and handrails were added to permit close-up viewing of the other mockups, such as the Airlock Module, the Multiple Docking Adapter, and the Apollo Telescope Mount, which are separated from the workshop module due to size restrictions in the building.

AMERICA'S OFFICIAL 1974 BICENTENNIAL MEDAL



The American Revolution Bicentennial Administration is offering the only official 1974 Bicentennial medal issued under authority given by the Congress of the United States. The medal is available in silver or bronze, and is being produced by the United States Mint.

Net revenues derived from the sale of this Bicentennial commemorative will be distributed by the ARBA primarily to help fund Bicentennial projects of states, communities and non-profit organizations throughout the 50 states, American Samoa, Guam, Virgin Islands, the District of Columbia and Puerto Rico.

The official 1974 Bicentennial medal features a bust of John Adams on the front. The reverse depicts a scene commemorating the First Continental Congress, which met at Philadelphia in September 1774. Beneath and to the right of the figure of John Adams is the official symbol of the American Revolution Bicentennial.

Designed by Robert A. Weinman, president of the National Sculpture Society, the medal is dated '1974' and comes mounted in a handsome presentation case.

Send $15 for each silver medal, $3.50 for each bronze medal to:
American Revolution Bicentennial Administration
Post Office Box 1976 A, San Francisco, Cal. 94101

Please send _____ silver medals to: (Limit 3 per order form)
Please send _____ bronze medals to: (Limit 4 per order form)

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Enclosed is my Check ☐ Money Order ☐ in the amount of $_____.
(Make check payable to ARBA.) Do not mail cash. All orders must be postmarked on or before October 31, 1974 and are noncancellable and nonrefundable. The ARBA reserves the right to limit quantities in filling orders.

NASA MANAGEMENT EMPLOYEE HEADS BICENTENNIAL GROUP

Paul Brockman, in This Capacity, Sees Many Similarities with Space Approach

The integrovernmental effort to coordinate Bicentennial-related activities in the Metropolitan Washington area is headed by a NASA employee. He is Paul R. Brockman of the Office of Management Planning and Review at Headquarters.

He came into this capacity as a member of the Falls Church (VA) City Council, which led to his appointment as Chairman of the Bicentennial Committee of the Metropolitan Washington Council of Governments.

Paul R. Brockman

The committee he heads has two aims: first, to see that the major national, state and local Bicentennial events in and around the nation's capital are coordintaed; and second, to see that the proper governmental and private agencies are prepared to cope with the substantial tourist increases expected in this area in 1975 and 1976—an estimated 60 million tourists, more than double its present visitor load.

In discussing his responsibility in connection with the Bicentennial, Brockman pointed out that coordination of local governmental activities in the Washington area has many similarities to NASA's management approach.

"What counts in both instances," he said, "is not the amount of formal authority or power you have. Success depends on getting people to work together voluntarily, on getting them to cooperate, and on helping them see a perspective that is larger than their own particular interest.

"What you know is important in both areas, but not so much as the desire and the ability to promote and encourage cooperative achievement. Modern urban problems usually are best solved through this approach. The alternative of a massive, centralized, unified local government for any large metropolitan area really removes the government from the people."

At a recent comprehensive conference on Bicentennial planning for the Washington area,

which he chaired, he observed that the Bicentennial will have "no master plan, and many participants—but that's how the American war for independence that we're remembering began."

Later, comparing this challenge to his experiences in NASA, he recalled that the Apollo system configuration and mission mode were not decided until more than a year after the nation was committed to the major Apollo objective.

"We decided we were going to do it well before we were sure just how we would go about it," he continued. "And it took over five more years to work out the rest of the Apollo mission objectives. We all learned a lot about working together in NASA and with our contractors for common goals, through shared authority and responsiiblity. Urban America needs that knowledge and ability, and I'm thankful that my neighbors in Falls Church and my fellow elected officials in this area recognize its value."

He considers this approach relevant wherever a metropolitan area is divided into several local governmental jurisdictions, and especially where the area spreads across state lines.

"Our NASA experience in getting separate organizations to cooperate for common aims without unifying their command structures is probably our most underrated asset," he said. "It may well have more lasting value for our society and for the American way of life than the technology which is being transferred to other social uses."

NEW EXHIBITS AT KSC

A number of new space exhibits have been added to the Kennedy Space Center's Visitor Information Center and its guided bus tour stops.

Among them is a mockup of the Mercury spacecraft, an armored personnel carrier adapted for astronaut rescue purposes, and a Saturn V third stage and instrument unit.

At the Flight Crew Training Building, where astronauts trained for the Apollo lunar missions, are two instruments like those left behind on the Moon's Sea of Tranquility by the Apollo 11 crew. They are a passive seismometer, useful in studying the Moon's internal structure and lunar seismic events, and a Laser Ranging Retroflector, designed to bounce laser rays back to Earth.

Among attractions at the Vehicle Assembly Building are full-scale mockups of the Apollo and Soyuz spacecraft to be flown as part of the joint U.S.-USSR Apollo-Soyuz Test Project next July.

WOMEN'S COORDINATOR—Ms. Ocie Hall, NASA Federal Women's Coordinator, recently visited Kennedy Space Center during a tour of NASA installations to observe operation of the Federal Women's Program. She is shown here with Dugald O. Black, KSC Equal Employment Advisory Council Chairman.

SUMMER INTERNS AT WORK

Five academically-outstanding college students were assigned to career-related summer job positions at Marshall Space Flight Center under the Federal Summer Intern Program, which has placed about 400 other students in employment positions in federal agencies across the nation.

Miss Carolyn Cole of Huntsville, AL, a junior majoring in mathematics at Auburn University, was assigned to MSFC's Computer Services Office.

Miss Naoma Alexander of Clarksville, MS, a senior majoring in accounting at Jackson State College, was assigned to the Center's Financial Management Office.

Charles Battles of Oakland, CA, a graduate of Oakwood College, Huntsville, served his internship in the Career Development Office.

Sandy Robinson of Mobile, AL, a junior majoring in pre-law at Oakwood College, worked in the Planning and Resources Office.

George Valentine of Sarasota, FL, a junior majoring in English and history at Oakwood College, was assigned to the Public Affairs Office.

The Very High Resolution Radiometer used in one of 20 experiments conducted with NASA's Applications Technology Satellite-6 has ceased to produce usable images of Earth. Before its malfunction, it produced more than 1,000 images, which are currently being analyzed by project scientists at Goddard Space Flight Center.

Detach here

QUESTIONNAIRE

(Please answer)

NASA ACTIVITIES has been published at Headquarters for the benefit of the agency's employees since March, 1970. We hope it is serving a useful purpose. For that reason primarily, we now are making a readership survey to learn what the readers have to say. Please fill out the following questionnaire at your earliest convenience and return to the National Aeronautics and Space Administration, Code FGC, Washington, DC 20546. Fold as indicated and tape or staple for mailing. No stamp is needed.

1. Do you feel the need for an agency-wide publication that informs you of what NASA is doing? Yes _____ No _____

2. Do you regularly receive and read NASA ACTIVITIES?
Yes _____ No _____

3. If you receive it, please check those of the following that you read:
   a. LETTER FROM WASHINGTON _____
   b. Monthly NASA Highlights _____
   c. Speech summaries _____
   d. Speech texts _____
   e. Items from Centers _____
   f. Your 1¢ Worth from Space _____

4. Check those of the following you find of value:
   a. Film Activity _____
   b. Lunar Sample Exhibits _____
   c. Radio-Television Releases _____
   d. Headquarters Press Releases _____
   e. Inventions and Contributions Board Monetary Awards _____
   f. Patents and Inventions _____
   g. Launch Schedule _____

5. What would you like to see in the publication that is not now included?

_____

6. What in the publication do you find most informative? _____

_____

7. What in the publication do you find least informative? _____

_____

(See other side)

8. What information does it provide that you do not find in your Center publication? _____

9. Do you like the present format and the manner in which articles are presented? Yes _____ No _____

10. Do others besides you read the copy you receive? Family _____ Friends _____ Others (Please specify) _____

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MRS. HARRIS TAKES OATH—Mrs. Katherine Walker (left), Director of Personnel Administration, administers the oath of office to Mrs. Ruth Bates Harris while Alfred P. Alibrando, Deputy Assistant Administrator for Public Affairs, looks on.

MRS. HARRIS RETURNS

Mrs. Ruth Bates Harris, former Director of Equal Employment Opportunity and later Deputy Assistant Administrator of OEO Programs at NASA Headquarters, has rejoined the space agency as Deputy Assistant Administrator of Public Affairs for Community and Human Relations.

In other Headquarters changes involving OEO, it was announced that Dr. Dudley G. McConnell, Assistant Administrator for Equal Opportunity since April, 1973, has been appointed Assistant Associate Administrator for Applications and has been succeeded in his former position by his deputy, Dr. Harriett G. Jenkins, who came to NASA last February after serving as educational consultant in the District of Columbia school system and earlier as Assistant Superintendent for Instruction in the Berkeley School District in California.

In her new position as deputy to John P. Donnelly, Assistant Administrator for Public Affairs, Mrs. Harris will be a major point of contact between the space agency and state and local governments and community groups across the United States. She will work closely at NASA with the Educational Program Division, Office of Facilities, Office of University Affairs, Office of Personnel and Office of Equal Opportunity Programs.

Dr. James C. Fletcher, NASA Administrator, said of the McConnell appointment: "Since NASA's Equal Opportunity Program is now well established and since Dr. McConnell has expressed a desire to return to the scientific field, where he attained prominence, we want to take advantage of his experience and ability to manage technical programs."

Dr. McConnell spent 12 years in laboratory research at Lewis Research Center before coming to NASA Headquarters in 1969.

SUFFRAGE DAY PROGRAM

NASA Headquarters observed on August 26 the 54th anniversary of the passage of the 19th Amendment, which gave women the right to vote, with a Women's Suffrage Day Program highlighted by an address by Lillian R. Levy, Senior Science Writer and Assistant Director, Division of Public Services, Office of Public Affairs.

Ms. Levy, who also served NASA as an EEO counselor, reminded the men and women in the audience that Susan B. Anthony and the people who joined her in her fight for women's rights more than a century ago were among the abolitionists who fought and won the fight for the voting privileges for male blacks, the former slaves.

Lillian R. Levy

She pointed out that, in the 54 years since women won the

GALILEO VISITORS—NASA's Galileo II from Ames Research Center is now in Africa as one of 12 aircraft from several nations participating in the largest meteorological research program ever attempted. On arrival at Dakar, where it is based, it was visited by 19 local Boy Scouts. In the inset, two of them are shown as they got a chance to see what things look like from the cockpit of a jet aircraft. Their leader, Silvere Gning, is standing with back to camera.

right to vote, they have exercised their voting power to place only a very few women in seats of political power. Only three women, she recounted, have been elected to the Senate, 78 to the House, two appointed to Cabinet positions, 14 named ministers and ambassadors, and three elected state governors. There are no women in the Cabinet today, she reminded, none in the Senate, none governors, only 16 in the House and only four women ambassadors.

"This reflects only a very small step forward for womankind," she said. "But, if man can reach the Moon, a woman—one day—will sit in the Oval Office of the White House. That will be a great step forward for all humanity."

The program also was the occasion for NASA employees at Headquarters to welcome back Ruth Bates Harris, former EEO Director.

Thiokol Corporation, Huntsville, AL, has been awarded an $8,900,000 NASA contract for strap-on motors to be used on the Delta Research Vehicle.

BUCHANAN HEADS NEW OFFICE

Appointment of Dr. Paul Buchanan, former Chief of the Health Maintenance Branch at Johnson Space Center, as Director of the newly-created Office of Life Sciences at Kennedy Space Center, effective Sept. 9, was announced by Dr. Kurt H. Debus, KSC Director.

The new office covers the entire spectrum of medical, biological and environmental services at the nation's Spaceport. As an operating officer, Dr. Buchanan will be responsible to the Center Director for occupational health, biological science activities, and biomedical instrumentation for the application of technical advances generated by NASA.

Dr. Buchanan was in private medical practice in Charleston, SC, from 1957 until he joined NASA in September, 1972. At JSC, he was charged with developing health maintenance programs for astronauts, their families and NASA aircraft operations personnel. He was also involved in formulating plans for the examination program and criteria for selection of Space Shuttle crews and scientist passengers.

GALILEO MEMORIAL FINALISTS—The five finalists from more than 60 applicants for the Galileo Memorial Scholarship were guests of Ames Research Center recently. Left to right, they are David Shapiro, Fremont High School, Sunnyvale; Gordon Stitt (winner), Aragon High School, San Mateo; Kathryn Yamada, Monta Vista High School, Cupertino; Michael Shin, McAteer High School, San Francisco; and Steven Kazerski, Homestead High School, Cupertino.

GALILEO SCHOLARSHIP WINNER

The first winner of the Galileo Memorial Scholarship set up in memory of the men who perished in the crash of the original NASA Galileo aircraft on April 12 of last year is Gordon Stitt, graduate of Aragon High School in San Mateo, CA.

His award of $500 was presented to him by Dr. Hans Mark, Director of Ames Research Center, at a recent meeting of the San Francisco Section of the American Institute of Aeronautics and Astronautics.

The Galileo Scholarship Program, which provides for a similar award to be presented annually to a high school senior seeking a career in engineering or science, was established by ARC and the AIAA San Francisco Section. It is financed by funds contributed by the NASA Ames Exchange Council and from a trust fund established by the AIAA group.

Tax deductible contributions may be sent to: AIAA/ARC Galileo Scholarship Fund, P.O. Box 1548, Mountain View, CA 94042.

NASA is validating techniques that may help alleviate air traffic congestion caused by aircraft wake-vortices.

CALIO GETS FELLOWSHIP

Anthony J. Calio, Director of Science and Applications for the Johnson Space Center, has been accepted by the Stanford Graduate School of Business as a Stanford-Sloan Fellow.

During his 10-month leave of absence, which began August 12, Dr. Owen K. Garriott, Deputy Director of Science and Applications and former scientist-astronaut on Skylab 3, will serve as Acting Director.

The Stanford-Sloan Program, which began Sept. 9 in Palo Alto, CA, is limited to 40 participants—upper level managers between 32–45 years of age. This year's class includes 18 foreigners and 24 Americans, 10 of the latter in government and 14 in private industry.

NASA opportunities in technical or science-oriented professions were reviewed by a delegation from the space agency attending the 39th annual conference of the National Association of Negro Business and Professional Women in Detroit, MI.

The delegation was headed by Dr. Harriett G. Jenkins, Assistant Administrator for Equal Opportunity, who addressed a workshop audience on the topic, "Non-traditional Careers for Women."

MAKING AIRPORTS SAFER—This Boeing-737 "flying laboratory" is to be used in a new flight research program at Langley Research Center to study specific problems associated with aircraft operations near airports. It is part of a joint government effort to identify, study, and solve national airspace congestion, safety during low visibility operations, and more efficient operations.

BLACK BECOMES ADVISOR

Dugald O. Black, Deputy Director of Support Operations at the Kennedy Space Center, has assumed the role of Science and Technology Applications Advisor in the Illinois Bureau of the Budget.

His assignment to work with the State of Illinois under the Intergovernmental Assignment Program, effective Sept. 3, is for a minimum of one year and a maximum of two years.

Dugald O. Black

Black will work under Harold A. Hovey, Director, Illinois Bureau of the Budget, with the responsibility for planning and implementation of programs to enhance the application of science and technology to state problems. His office will be in the state capitol in Springfield.

The assignment was made at the request of the state to provide technical expertise and assistance by the application of space-derived technology developed by the Federal Government to problems of public concern.

Black will assist the state in implementing space-oriented solutions to current problems based on application of NASA technology. He will also assist scientifically-oriented branches of state government in applying NASA technology to public health, medicine, pollution detection, waste water treatment, energy, mining and agriculture.

Under the Intergovernmental Assignment Program, employees may be assigned between Federal executive agencies and state and local governments and institutions of higher education. Black is the first KSC executive to be selected for the program.

TELESCOPE CAUSES SCARE

Marshall Space Flight Center's Skylark SL1115 flight payloads almost didn't get into England.

Upon arrival of the X-ray telescope equipment at Heathrow International Airport in London, an airline official heard ticking sounds coming from the package and immediately had it moved to a maximum security area for inspection by explosives experts.

They soon determined that the ticking came not from a time-bomb, but from an impactography—a clock-drive-type accelerometer which is part of the Skylark SL1115 payload.

But after the explosives experts had finished, British customs officials took over—and held the equipment in lieu of 50,000 pounds ($120,000) import duty, based on its $900,000 declared value.

Mrs. Virginia Scott of the MSFC Transportation Office hurriedly got off a Telex to England, informing customs officials that the item was duty-free. This information apparently had no effect.

Finally, officials at London's Mullard Space Science Laboratory intervened, contacting the U.K. Science Research Council, which in turn got the British Ministry of Defense to release the package.

ASTRONAUT SCIENCE CHIEF NAMED

Dr. Robert A. R. Parker, scientist-astronaut and program scientist for the Skylab missions, has been named Chief of the Astronaut Office, Science and Applications Directorate, at Johnson Space Center.

He succeeds Dr. Harrison H. Schmitt, who was named Assistant Administrator for Energy Programs at NASA Headquarters in May. Since the latter's transfer, Dr. Owen Garriott has served as Deputy Director.

Dr. Parker was appointed a scientist-astronaut in 1967 and was a member of the support crews for the Apollo 15 and 17 missions. He holds a doctorate in astronomy from the California Institute of Technology.

LOGISTICS AWARD WINNER

Mrs. Mildred B. Bobo, deputy of the Transportation Management Division, Logistics Office, at Marshall Space Flight Center, has been chosen to receive the Field Award for Government Service of the Society of Logistics Engineers (SOLE), International.

This award is presented annually in recognition of outstanding contributions made by individuals in the application of technical and management skills in the area of government service.

Mildred B. Bobo

In 1960, Mrs. Bobo assisted in the establishment of logistics and transportation services for the transition of personnel from the U.S. Army Ballistic Missile Agency at Redstone Arsenal to NASA for formation of the Marshall Center. She later aided with transportation functions of the Mississippi Test Facility at Bay St. Louis, MS, and the Michoud Assembly Facility at New Orleans.

Mrs. Bobo gained the distinction in 1971 of being the first woman in the Southeast to become a member of the American Society of Traffic and Transportation.

MUSEUM SEEKS VOLUNTEERS

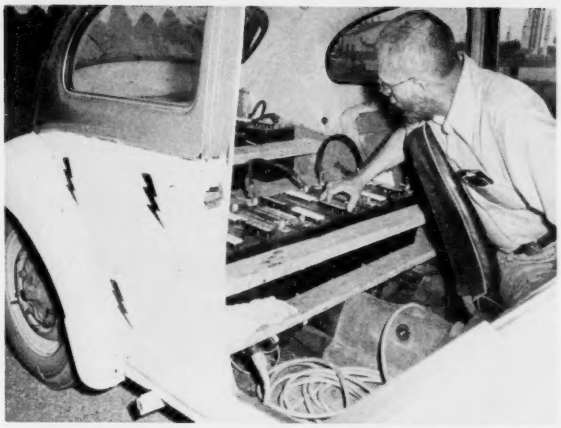
The National Air and Space Museum at the Smithsonian Institution is recruiting volunteers to serve with its education programs, according to John W. Bingham, Education Officer.

The search is for persons qualified as docents to provide lesson tours in the Museum for visiting school groups.

Basic qualifications required of applicants include the desire to teach, to become recognized interpreters of the Museum's artifacts, and to be capable of communicating effectively with young people.

Those selected will be required to attend training sessions in the fall, commencing Sept. 10, and to give one morning per week during the school year to volunteer service.

Recent NASA retirees in the Washington area who have time to spare and who would be interested in working with children in a museum setting are urged to phone Barbara Taylor at 381-5240.



HOME-MADE ELECTRIC CAR—Bill Varnedoe, an employee of MSFC's Electronics and Control Laboratory, inspects the lead acid batteries that power his "Lightning Bug" electric car.

BUILDS ELECTRIC CAR

Bill Varnedoe of the Marshall Space Flight Center's Electronics and Controls Laboratory has built an electric car at his home from a 1962 Volkswagen.

The "battery buggy" draws its power from 10 90-ampere lead acid batteries that power a 27-horsepower electric motor for a top speed of 50 miles per hour.

Varnedoe claims his backyard invention is still in the "research and development stage," but says he can now travel about 40 miles between overnight battery charges from a standard 110-volt circuit.

The MSFC engineer began plans to build the car almost four years ago and has since then been gathering parts. The buggy employs the VW's original transmission and, according to Varnedoe, was relatively simple to build.

The biggest problem Varnedoe says he encountered in building the car was finding a suitable electric motor and having to wait for catalog orders of smaller parts.

MSFC ENERGY SAVINGS

The Marshall Space Flight Center reached an overall energy savings of 24 per cent for fiscal year 1974, surpassing the Center's established goal of a 15 per cent reduction based on a five-year average.

The Center's energy conservation program was initiated in June, 1973, as a part of NASA's

response to the President's appeal for energy savings. The national effort was set at a 7 per cent reduction.

A series of major energy reduction measures initiated by the Center include controlled heating and cooling of buildings, reduced lighting, establishment of an energy conservation program, and encouragement of car pools.

The MSFC goal for energy reduction for FY 75 is to maintain the same magnitude of savings as in FY 74.

DRYDEN IN HALL OF FAME

Dr. Hugh L. Dryden, Deputy Administrator of NASA from its creation until his death in 1965, was one of four scientists chosen through the 1974 election process for membership in the International Aerospace Hall of Fame.

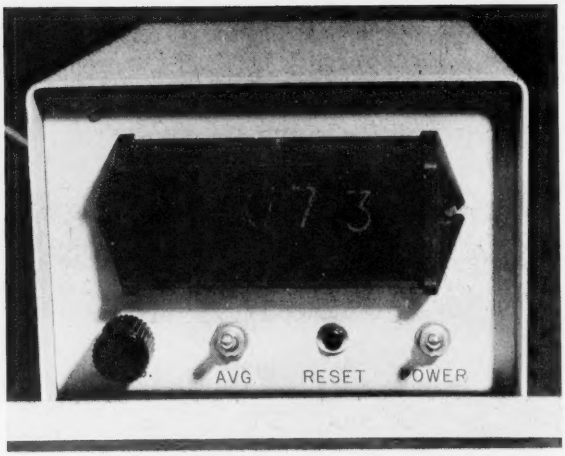
The other three are Sir George Cayley, 1773-1857, often called the Father of British Aviation; Octave Chanute, 1832-1910, early American aviation pioneer who experimented with various glider designs; and Dr. Jean de la Cierva, 1896-1936, Spanish aeronautical engineer who invented the autogiro.

Dr. Dryden performed research in aircraft and missiles as early as 1918, carrying out his work in the Bureau of Standards. He had a long association with various U.S. aeronautical technical committees and with NACA before becoming Deputy Administrator of NASA.

He was awarded the Sylvanus Reed Award, the U.S. Army Air Forces' Medal of Freedom, the Guggenheim Medal, the Wright Brothers Trophy, the Langley Medal and the Goddard Memorial Trophy, as well as many other awards and degrees.

The investiture ceremony in connection with this year's Hall of Fame election will take place in San Diego, CA, Oct. 26 at a banquet that will feature the unveiling of portraits of the four scientists and the persentation of awards on their behalf.

A special address recalling the First World Flight of 1924 will be delivered for the occasion by the renowned author, Lowell Thomas. Surviving crew members will be on hand to receive a commemorative medallion issued through the American Aviation Historical Society.



Cardiotachrometer developed at MSFC

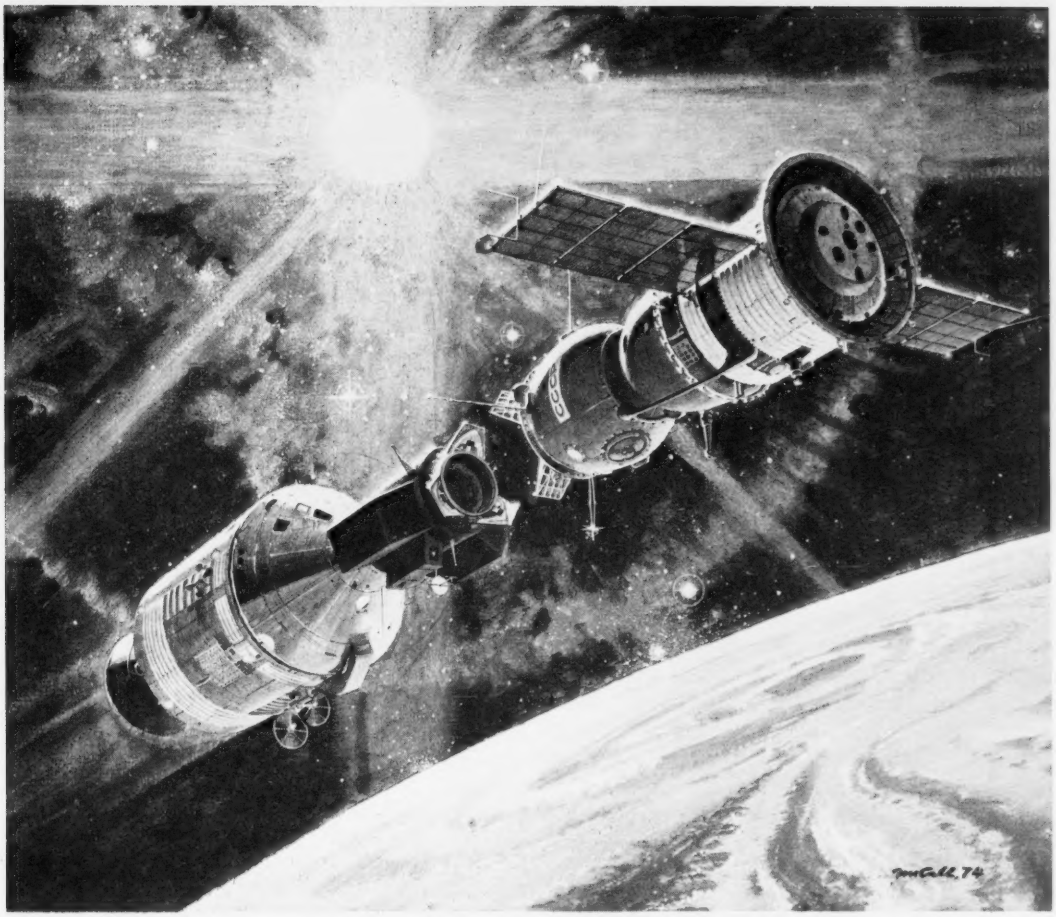
MONITORING HEART BEATS

A digital computing cardiotachrometer first used by physicians at Marshall Space Flight Center to monitor the pulse rates of astronauts is now being used in non-space-oriented medical applications.

The device, which is about the size of an ordinary shoe box and weighs approximately five pounds, provides a numerical display of a subject's pulse rate 0.3 seconds after detecting his heart beat. It was used at the Veterans Administration Hospital and University Hospital in Birmingham, AL, for about one year and is now employed in routine physical examinations given MSFC personnel at the Center's employee medical facility.

The cardiotachrometer was developed by Hubert E. Smith, John R. Rasquin and Roy A. Taylor, engineers in the Center's Materials and Processes Laboratory. Patent rights are held by NASA.

NASA has announced the award of a contract to RCA Astro Electronics Division, Princeton, NJ, to provide two operational meteorological spacecraft, ITOS-H and -I, and parts for ITOS-J. The satellites will be used by the National Oceanic and Atmospheric Administration to support the National Operational Meteorological Satellite System through 1978.



ASTP ACTIVITY INCREASES—Plans and training looking toward the joint mission next year between the U.S. and USSR, officially designated the Apollo-Soyuz Test Project (ASTP), are moving along at a rapid pace. As depicted here by an artist, a manned American spacecraft will dock with a manned Soviet spacecraft.

Soviet cosmonauts assigned to the mission arrived in Houston earlier this month and are now undergoing training at the Johnson Space Center, while a large delegation of U.S. engineers and specialists, headed by Dr. Glynn S. Lunney, U.S. Technical Director for ASTP, are now in Moscow taking part in technical and management meetings.

The training at Houston will end Sept. 27. It will include flight simulation, procedures training in Apollo and docking module mockups, communications training, and study of spacecraft systems.

SHUTTLE ORBITER TRANSPORT—The Boeing 747 that will be used to transport the Space Shuttle and related Shuttle hardware from California to Florida is shown at Flight Research Center after its recent arrival. It also will be used in the planned approach and landing tests of the reusable Orbiter to take place at FRC in 1977.

Radio signals from outside Earth's galaxy will soon be used to detect almost imperceptible movements in the Earth's crust that may lead to the accurate prediction of earthquakes.

A team of scientists and engineers at the Jet Propulsion Laboratory, aided by geophysicists at Caltech's Seismological Laboratory, is developing an Earth-fault monitoring system which combines experience gained from spacecraft navigation with current radio astronomy and geophysical research.

A demonstration of the Applications Technology Satellite's (ATS-6) Health-Education Telecommunications (HET) experiments will be held at 2:45 p.m. Sept. 24 in the NASA Headquarters auditorium.

Caspar Weinberger, Secretary of Health, Education and Welfare, and Dr. James C. Fletcher, NASA Administrator, will participate in a news conference to be held in connection with the demonstration.

Six experimenter groups will beam demonstration programs to Washington via ATS-6. Three of the programs will be received directly from the satellite by a portable antenna located on the roof of the Headquarters building, while others will be received at the Rosman, NC, tracking station and relayed to Washington.

LUNAR SAMPLE EXHIBITS

The following is a schedule of lunar sample exhibits from Sept. 15 to Oct. 15, 1974:

CALIFORNIA—Lawrence Hall of Science, Berkeley, September.

COLORADO—High Flight Foundation, Colorado Springs, Aug. 15-Sept. 20.

IOWA—National Dairy Cattle Congress, Waterloo, Sept. 21-29.

KENTUCKY—Dedication Ceremonies, New Science Bldg., Northern Kentucky State College, Sept. 13-20.

MINNESOTA—FAA Open House, 512 Division, Street, Farmington, Sept. 14-17.

MISSISSIPPI—Mississippi/Alabama State Fair, Meridian, Oct. 7-12.

NEW JERSEY—Franklin Mineral Museum, Franklin, October.

NEVADA—Jaycees State Fair, Las Vegas Convention Center, 3150 South Paradise Road, Las Vegas, Sept. 18-22.

NORTH CAROLINA—Charlotte Nature Museum, Charlotte, September and possibly October.

OHIO—Armstrong Air and Space Museum, Wapakoneta, July 8-Sept. 30.

TEXAS—Open House, Randolph Air Force Base, Oct. 5; Houston Museum of Natural Science/History, End of Caroline at Hermann Park, Houston, Sept. 15-Oct. 15.

VIRGINIA—USAF Open House, Hampton, Sept. 21.

WISCONSIN—Indianhead Gem & Mineral Club, Greenwood, Oct. 5-6.

Permanent Displays

ALABAMA—Alabama Space & Rocket Center, Marshall Space Flight Center, Huntsville.

FLORIDA—Visitor Information Center, Kennedy Space Center.

KANSAS—Eisenhower Library, 200 SE 4th Street, Abilene.

NEW YORK—United Nations Building, New York City.

OHIO—USAF Museum, Wright Patterson Air Force Base.

TEXAS—Johnson Library, University of Texas, Austin; Visitor Information Center, Johnson Space Center, Houston.

VIRGINIA—Visitor Information Center, Langley Research Center, Hampton.

WASHINGTON, DC—National Geographic Museum; Smithsonian Institution, National Air and Space Museum, 1000 Jefferson Drive.

FILM ACTIVITY

The NASA film "MARS—THE SEARCH BEGINS" has been honored with a Gold Medal Award at the Atlanta International Film Festival. This is the first place award in the Documentary-Scientific and Research category. There were over 2,000 entries from 32 nations competing in the 65 categories.

NEW NASA PUBLICATIONS

APOLLO, produced by the NASA Office of Public Affairs, summarizes in color illustrations and magazine-style format, 10½ x 4 inches, the historic program to land men on the Moon. The document is for sale by the Government Printing Office, Washington, DC 20402, stock

number 3300-00553. (EP-100)

GENERAL AVIATION TECHNOLOGY PROGRAM is a NASA fact sheet produced by the Office of Public Affairs. Copies are available at the Office of Public Information.

SPACELAB is the title of a pocket-sized folder produced by the Office of Public Affairs and is available at the Office of Public Information.

RADIO-TELEVISION (Released Nationally)

September

TELEVISION—A color film release in the *Aeronautics and Space Report* series, "Space Hardware Benefits Amputees."

RADIO—Five weekly *Space Story* programs are to be released: "MIUS," (JCS/Hays); "YF-12 Research," (FRC/Matrange); "Earth Resources Programs," (JSC/Charlesworth); "Solar House," (MSFC/Murphy); and "Shuttle Development," (MSFC/Lindstrom). One monthly *NASA Special Report*, "Mariner-10 Mercury Reencounter."

HEADQUARTERS PRESS RELEASES

(Issued by the Public Information Division, Code FP, Headquarters, Washington, DC 20546. These releases are available only to members of the news media.)

74–217 Dr. McConnell Named to Applications Post
74–218 NASA to Order More ITOS Weather Satellites
74–219 NASA Awards Thiokol Corp. Contract (Strap-on Motors)
74–220 Delta Review Committee Completes Report
74–221 Groo Named to Center Operations Post
74–222 Thole Named Deputy Associate Administrator for Space Science
74–223 Ruth Bates Harris Assumes New NASA Post
74–224 ANS (Netherlands) Press Kit
74–225 NASA Men in England on Skylark Project
74–226 Low-Noise Aircraft Landings Checked by Airline
74–227 NASA Tests New Wing for Light Aircraft
74–228 Astronaut Gibson Announces Resignation
74–229 Lighter-than-Air-Workshop Planned at Ames
74–230 NASA Test Techniques to Eliminate Aircraft Wake Vortices
74–231 NASA Studies Earthquake Prediction Techniques
74–232 (NTE) NASA, HEW Briefing on Communications Staellite Technology
74–233 NASA Satellite Begins Third Year of Astronomy Study
74–234 NASA Reviews Opportunities for Technical Careers
74–235 ATS–6 Spacecraft Camera Malfunctions
74–236 Dr. Lovelace Named OAST Associate Administrator
74–237 Tennessee State U. Receives NASA Grant
74–238 Pioneer Findings Paint New Picture of Jupiter (Press Kit)
74–239 Martin Marietta Shuttle Tanks Contract
74–240 Contract for First Three HEAO Spacecraft.
74–241 (NTE) Jupiter Special Briefing
74–242 Fletcher Statement on Soyuz 15
74–243 (NTE) Langley Center Plans Week-long Review of NASA Technology

NASA TECH BRIEFS

(The Technology Utilization Office, NASA Headquarters)

(The following compilations of Tech Briefs have recently been published:)

Graphic Arts Techniques and Equipment—NASA SF-5919 (02)—27 items
Safety and Maintenance Engineering—NASASP–5928 (02)—27 items
Fluid Technology (Selected Components, Devices, and Systems)—NASA SP-5938 (02)—28 items
Automatic Controls and Regulators—NASA SP-5956 (01)—31 items
Analytical Techniques and Instrumentation—NASA SP-5957 (02)—30 items

(For sale by the National Technical Information Service, Springfield, VA, at $1 per copy.)

PATENTS FOR INVENTIONS RESULTING FROM NASA RESEARCH

(The Office of General Counsel, NASA Headquarters, announces that the following U.S. patents have been issued by the U.S. Patent Office to NASA for inventions resulting from NASA research. Inquiries concerning them should be directed to the attention of the NASA Patent Counsel for the indicated installation.)

Inventor(s) and Employer	*Title and NASA Docket*	*Patent No.*	*Installation*
Frank Byrne, NASA/KSC	Digital Serbo Controller (KSC-10, 769-1)	3,826,964	KSC
Robert B. Nakich, Caltech/JPL, Pasadena, CA	Digital Servo Control of Random Sound Test Excitation (NPO-11,623-1)	3,827,288	NaPO
William E. Zorumski, NASA/LaRC	Noise Suppressor (LAR-11,141-1)	3,830,335	LaRC
Franklin W. Booth and Robert A. Bruce, NASA/LaRC	Centrifugal Lyophobic Separator (LAR-10,194-1)	3,828,524	LaRC
Wilbur C. Heier, NASA/LaRC)	Apparatus and Method of Molding (LAR-10,489-2)	3,820,609	LaRC

PATENTS FOR INVENTIONS RESULTING FROM NASA RESEARCH—Cont.

Richard L. Gutshall and Randall T. McConaughey, Ball Bros. Corp., Boulder, CO, and Frank A. Volpe, NASA/GSFC)	Star Scanner (GSC-11,469-1)	3,827,807	GSFC
Frederick T. Schuller and Warren A. Moore, NASA/LeRC	Journal Bearings (LEW-11,076-2)	3,830,522	LeRC
Leo G. Monford, Jr., NASA/JSC	Digital Communication System (MSC-13,912-1)	3,828,137	JSC
Jimmie H. Holden, NASA/MSFC	Fixture for Handling Panel Articles (MFS-22,345-1)	3,827,742	MSFC
Davis Chestnutt, NASA/LaRC	Variable Guide Vanes for Aerodynamic Choking (LAR-10,642-1)	3,829,237	LaRC
Lubert J. Leger, NASA/JSC	Method and Device for Detection of Surface Discontinuities or Defects (MSC-14,187-1)	3,820,094	JSC
Anthony Fortini, NASA/LeRC	Rocket Chamber and Method of Making (LEW-11,118-1)	3,832,290	LeRC
Marvin K. Simon and William C. Lindsey, Caltech	Coherent Receiver Employing Nonlinear Coherence Detection for Carrier Tracking (NPO-11,921-1)	3,828,138	NaPO
Arthur J. Kline, Motorola	Capacitance Multiplier Filter Synthesizing Network (NPO-11,948-1)	3,831,117	NaPO
John I. Shafer and George M. Simmons, Caltech	Solid Propellant and Method of Preparation (NPO-11,-975-1)	3,830,673	NaPO
George D. Doland, Lockheed Electronics Co., Inc., Houston, TX	Method and Apparatus for Decoding Compatible Convolutional Codes (MSC-14,070-1)	3,831,142	JSC
Reed S. Lindsey, Jr., Lockheed Electronics Co., Inc.	Pulse Stretcher for Narrow Pulses (MSC-14,130-1)	3,831,098	JSC
Ira R. Schwartz, NASA/ARC	Improvements for Abating Exhaust Noises in Jet Engines (ARC-10,712-1)	3,830,431	ARC
James R. Jedlicka, Le Roy R. Guist and Richard M. Beam, NASA/ARC	Solid Medium Thermal Engine (ARC-10,461-1)	3,830,060	ARC

1974 LAUNCH SCHEDULE

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*	
Skynet II–A (UK)	Jan. 18	Delta	ETR	Reimbursable launch. United Kingdom's communications satellite.	Launched Vehicle failure
Centaur Proof Flight	Feb. 11	Titan III–E Centaur	ETR	Test flight of booster planned for Viking Mars launch in 1975.	Unsuccessful Engine failure
San Marco (SM–C2)	Feb. 18	Scout	SM	United States/Italy cooperative mission to conduct air density measurements.	Launched
UK X–4	Mar. 8	Scout	WTR	Reimbursable launch. United Kingdom technology satellite with experiments related to spacecraft power systems, attitude control and stabilization.	Successful
WESTAR–A	April 13	Delta	ETR	Western Union communications satellite. Reimbursable launch.	Successful
SMS–I	May 17	Delta	ETR	First prototype/developmental mission for geostationary meteorological operational satellite system; day and night continuous imaging of cloud cover; sophisticated remote-platform data-collection-and-weather data relay.	Launched
ATS–6	May 30	Titan III–C	ETR	Developmental and demonstrative communications mission using technology applicable to terrestrial and space needs; utilizes 9.15-meter (30-foot) deployable parabolic antenna and communications system with frequencies in several bands; will support public communications experiments in the U.S. and India.	Launched

1974 LAUNCH SCHEDULE—Cont.

Name	*Launch Date*	*Vehicle*	*Range*	*Mission/Remarks*	
Hawkeye (formerly Injun-F)	June 3 ..	Scout	WTR	To study the topology of the magnetic field at large radial distance over the Earth's dgear caps and the interaction of the solar winds with the geomagnetic field.	Launched
AEROS–B (German)	July 16 ..	Scout	WTR	Spin-stabilized, Earth-orbiting satellite designed for upper atmosphere measurements.	Launched
Netherlands Sat.–A (ANS–A)	August 27	Scout	WTR	Designed to obtain data from celestial X-ray and ultraviolet sources.	Launched
WESTAR–B	Oct. 8	Delta	ETR	Western Union communications satellite. Reimbursable launch.	
UK–5	Oct. 8	.....	.....	To investigate galactic and extra galactic X-ray sources.	
ITOS–G	Oct. 10	Delta	WTR	Polar-orbiting operational meteorological satellite funded by NOAA; day and night cloud cover and temperature sounding. Launch includes two piggyback payloads, Intasat and Oscar.	
Helios–A	October ..	Titan III	ETR	To investigate the properties of and processes in interplanetary space in the direction of and close to the Sun by developing, launching and operating automated spacecraft.	
Nimbus F	October	Delta	WTR	Meteorological research and development mission to test instruments for expanding atmospheric remote sensing to cloud regions, extend observations to new spectral regions, extend sounding capabilities to higher altitudes, demonstrate feasibility for improvements to operational systems, and support GATE.	
Skynet II–B (UK)	November	Delta	ETR	Reimbursable launch. United Kingdom communications satellite.	
GEOS–C	December	Delta	WTR	Geodynamic Experimental Ocean Satellite to demonstrate feasibility of satellite-altimeter techniques for measuring the topography of the ocean surface; can be significant contribution to understanding of ocean dynamics.	
Comsat–A	4th Qtr. ..	Delta	ETR	First of two maritime communications satellites to be situated over Atlantic and Pacific Oceans.	
Symphonie–A (French/German)	4th Qtr. ..	Delta	ETR	Experimental communications satellite. Reimbursable.	
Intelsat IV F–8 ..	(Under Study)	A–Centaur ..	ETR	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.	
WESTAR–C	(Under Study)	Delta	ETR	Western Union communications satellite. Reimbursable launch.	
Intelsat IV F–1 ..	(Under Study)	.....	.....	One of a series of communications satellites to form part of a global communication commercial satellite system. Launch for COMSAT.	
Intelsat IV F–6 ..	(Under Study)	.....	.....	One of a series of communications satellites to form part of a global communications commercial satellite system. Launch for COMSAT.	
SMS–B	(Under Study)	Delta	ETR	Second prototype/developmental mission for geostationary meteorological operational satellite system; same as SMS–I.	
GOES–A (SMS–C)	(Under Study)	Delta	ETR	First Geostationary Operational Environmental Satellite, follow-on to SMS missions, funded by NOAA.	

ARE YOU GETTING YOUR

WORTH FROM SPACE?

FOR A PENNY OF YOUR TAX DOLLAR, YOU ARE GETTING ...

BETTER-FITTING, QUICK-RELEASING ARTIFICIAL ARMS AND LEGS

The releasing mechanism that holds Saturn rockets on their pads until their engines reach full thrust, coupled with the high-purity carbon employed as lining for space engine nozzles and space capsule heat shields, is making life easier for amputees.

For centuries, man has replaced amputated arms with hooks and amputated legs with peglegs or more complicated artificial limbs. But this has involved troublesome trappings, such as straps and belts.

In recent years, space and medical experts have combined efforts to come up with replacements which can be attached directly to the stump of an amputee and can be detached by the push of a button. No trappings are needed.

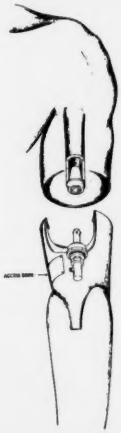
It all started seven years ago when Rocketdyne and the Rancho Los Amigos Hospital at Downey, CA, were involved under a technology applications contract with Marshall Space Flight Center. Engineers became impressed at that time with the purity of carbon they were using, which permitted it to protrude through skin without becoming reactive to living tissue, just as teeth passing through gums or nails through the skin of fingers.

From NASA's standpoint, use of carbon dates back to the earlier aerospace years when the search was for materials which could tolerate the rigors of space and of rocket engines. The engineers realized potential biologic applications.

Thoughts began building. Some time later, recalls Dr. Vert Mooney, Chief of the Amputee Center at Rancho Los Amigos Hospital, problems associated with using carbon in connection with amputated limbs were discussed at a meeting attended by representatives of various NASA installations. Kennedy Space Center engineers were particularly interested and offered their help. In less than six months, they came up with a scaled-down version of the quick-release mechanism used on Saturn rockets and with a special shock-absorbing rubber isolator.

The finished procedure was soon realized. Under its methods, a stainless steel shaft is inserted into the bone of an amputated arm or leg and fitted with a carbon collar at the point where it protrudes through the skin. The limb replacement is then snapped into position and can be released instantly by the use of a device called a ball-lock pin, something employed on all Saturn vehicles.

Although the procedure is still in the research stages, its potential appears highly promising.



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"FOR THE BENEFIT OF ALL MANKIND."

AMERICAN REVOLUTION BICENTENNIAL 1776-1976